

SEQUENCE LISTING

<110> Novak, Rodger
Toumanen, Elaine

<120> NOVEL ANTIBIOTICS AND METHODS OF USING THE SAME

<130> 1340-1-016N1

T₁ 0970
<140> Unassigned
<141> 2000-01-28

<150> 60/084,399
<151> 1998-05-06

<150> 09/305,984
<151> 1999-05-05

<160> 76

<170> PatentIn Ver. 2.0

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<210> 1
<211> 75
<212> DNA
<213> Streptococcus pneumoniae

<400> 1
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gcaagagact ataat 75

<210> 2
<211> 25
<212> PRT
<213> Streptococcus pneumoniae

<400> 2
Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 3
<211> 75
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Encodes
modified Streptococcus Pneumonia peptide

<400> 3

atgagaaaagg aatttcacaa cgtttatct gctggcagt tgcttcaga caaaaggcca 60
gcaagagact ataat 75

<210> 4

<211> 25

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Modified
Streptococcus Pneumonia peptide

<400> 4

Met Arg Lys Glu Phe His Asn Val Leu Ser Ala Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 5

<211> 75

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Encodes
modified Streptococcus Pneumonia peptide

<400> 5

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<210> 6

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Modified
Streptococcus Pneumonia peptide

<400> 6

Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
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Asp Lys Arg Pro Ala Arg Asp Ala Asn
20 25

<210> 7

<211> 42

<212> DNA

<213> Streptococcus pneumoniae

<400> 7

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<210> 8

<211> 14

<212> PRT

<213> Streptococcus pneumoniae

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<400> 8

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<210> 9

<211> 33

<212> DNA

<213> Streptococcus pneumoniae

<400> 9

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<210> 10

<211> 11

<212> PRT

<213> Streptococcus pneumoniae

<400> 10

Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn
1 5 10

<210> 11

<211> 84

<212> DNA

<213> Streptococcus pneumoniae

<400> 11
atggaattta tgagaaagga atttcacaac gtttatcta gtggtcagtt gcttgcagac 60
aaaaggccag caagagacta taat 84

<210> 12
<211> 28
<212> PRT
<213> Streptococcus pneumoniae

<400> 12
Met Glu Phe Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln
1 5 10 15

Leu Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 13
<211> 1329
<212> DNA
<213> Streptococcus pneumoniae

<400> 13
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cgtcaggaaa ccattggta aaaggcaaca gccattgccc agtccctaga agggaaagat 180
aggcagagta tcgagcaagt gtttagactt tattccaga ctatgtatat caaggggacc 240
gtcaaagggtg agatgaccga ggacaagttt gaagtcaagg acagtcttcc tctggacaca 300
gaccgcccaga caacctctt ctttattttag gagcgcgagg tgaaaacgca agacgggtgg 360
actatgattt tccagtttctt agcttccatg gatttacaaa aggaagcgga gcaaattcagt 420
ctccagtttcc ttccctatac cttgctggcc tccttcttga ttccctttt ggtggcctac 480
atctacgctc ggactattgt tgcaccgatt ttggaaatca agcgggtgac ccgtcggatg 540
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aagaatcaaaa tcaatagcctt ctaccagcat ctcttgactt ttattgcggta cttgcatgaa 660
aagaatgaag ccattctcca gctggagaag atgaaggctcg aattcctacg aggagcttct 720
catgaattga aaacaccgct ggcttagttt aaaaatctaa tcgaaaatata gagaagaaat 780
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<210> 14
<211> 442
<212> PRT
<213> Streptococcus pneumoniae

<400> 14
Met Lys Arg Thr Gly Leu Phe Ala Lys Ile Phe Ile Tyr Thr Phe Ser
1 5 10 15

Ile Phe Ser Val Leu Val Ile Cys Leu His Leu Ala Ile Tyr Phe Leu
20 25 30

Phe Pro Ser Thr Tyr Leu Ser His Arg Gln Glu Thr Ile Gly Gln Lys
35 40 45

Ala Thr Ala Ile Ala Gln Ser Leu Glu Gly Lys Asp Arg Gln Ser Ile
50 55 60

Glu Gln Val Leu Asp Leu Tyr Ser Gln Thr Ser Asp Ile Lys Gly Thr
65 70 75 80

Val Lys Gly Glu Met Thr Glu Asp Lys Leu Glu Val Lys Asp Ser Leu
85 90 95

Pro Leu Asp Thr Asp Arg Gln Thr Thr Ser Leu Phe Ile Glu Glu Arg
100 105 110

Glu Val Lys Thr Gln Asp Gly Gly Thr Met Ile Leu Gln Phe Leu Ala
115 120 125

Ser Met Asp Leu Gln Lys Glu Ala Glu Gln Ile Ser Leu Gln Phe Leu
130 135 140

Pro Tyr Thr Leu Leu Ala Ser Phe Leu Ile Ser Leu Leu Val Ala Tyr
145 150 155 160

Ile Tyr Ala Arg Thr Ile Val Ala Pro Ile Leu Glu Ile Lys Arg Val
165 170 175

Thr Arg Arg Met Met Asp Leu Asp Ser Gln Val Arg Leu Arg Val Asp
180 185 190

Ser Lys Asp Glu Ile Gly Asn Leu Lys Glu Gln Ile Asn Ser Leu Tyr
195 200 205

Gln His Leu Leu Thr Val Ile Ala Asp Leu His Glu Lys Asn Glu Ala
210 215 220

Ile Leu Gln Leu Glu Lys Met Lys Val Glu Phe Leu Arg Gly Ala Ser
225 230 235 240

His Glu Leu Lys Thr Pro Leu Ala Ser Leu Lys Ile Leu Ile Glu Asn
245 250 255

Met Arg Glu Asn Ile Gly Arg Tyr Lys Asp Arg Asp Gln Tyr Leu Gly
260 265 270

Val Ala Leu Gly Ile Val Asp Glu Leu Asn His His Val Leu Gln Ile
275 280 285

Leu Ser Leu Ser Ser Val Gln Glu Leu Arg Asp Asp Arg Glu Thr Ile
290 295 300

Asp Leu Leu Gln Met Thr Gln Asn Leu Val Lys Asp Tyr Ala Leu Leu
305 310 315 320

Ala Lys Glu Arg Glu Leu Gln Ile Asp Asn Ser Leu Thr His Gln Gln
325 330 335

Ala Tyr Leu Asn Pro Ser Val Met Lys Leu Ile Leu Ser Asn Leu Ile
340 345 350

Ser Asn Ala Ile Lys His Ser Val Pro Gly Gly Leu Val Arg Ile Gly
355 360 365

Glu Arg Glu Gly Glu Leu Phe Ile Glu Asn Ser Cys Ser Ser Glu Glu
370 375 380

Gln Glu Lys Leu Ala Gln Ser Phe Ser Asp Asn Ala Ser Arg Lys Val
385 390 395 400

Lys Gly Ser Gly Met Gly Leu Phe Val Val Lys Ser Leu Leu Glu His
405 410 415

Glu Lys Leu Ala Tyr Arg Phe Glu Met Glu Glu Asn Ser Leu Thr Phe
420 425 430

Phe Ile Asp Phe Pro Lys Val Val Gln Asp
435 440

<210> 15
<211> 657
<212> DNA
<213> Streptococcus pneumoniae

<400> 15

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tctagctatg aggtggccct ggtttactg gatatccaga tgcccaagct caacggctta 180
gaagtccctag ctgagattcg taaaaccagt caggttcctg tcttgatgtt gacagcttt 240
caagatgagg aataacaagat gagtgcctt gccttgg cagatggcta tctggaaaaa 300
ccttctccc tctcccttt aaaagtgagg gtggacgcga ttttcaagcg ctactacgt 360
acaggacgaa tctttctta caaggatacc aagggtggact ttgaaagcta cagtgcagc 420
ctcgcaggc aagaagtgcc tatcaatgcc aaagagttgg aaattctgga ctatctagtg 480
aaaaatgaag gccgggcctt gactcgatct cagattatcg atgcccgtctg gaaagcgaca 540
gatgagggttc ccttgaccg tgttattgtat gtttatata aggaattgcg gaaaaagcta 600
gacttggatt gtatcctcac tgtgcgaat gttggttata aattggagcg aaaaatga 657

<210> 16

<211> 218

<212> PRT

<213> Streptococcus pneumoniae

<400> 16

Met Lys Ile Leu Ile Val Glu Asp Glu Glu Met Ile Arg Glu Gly Val
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Ser Asp Tyr Leu Thr Asp Cys Gly Tyr Glu Thr Ile Glu Ala Ala Asp
20 25 30

Gly Gln Glu Ala Leu Glu Gln Phe Ser Ser Tyr Glu Val Ala Leu Val
35 40 45

Leu Leu Asp Ile Gln Met Pro Lys Leu Asn Gly Leu Glu Val Leu Ala
50 55 60

Glu Ile Arg Lys Thr Ser Gln Val Pro Val Leu Met Leu Thr Ala Phe
65 70 75 80

Gln Asp Glu Glu Tyr Lys Met Ser Ala Phe Ala Ser Leu Ala Asp Gly
85 90 95

Tyr Leu Glu Lys Pro Phe Ser Leu Ser Leu Leu Lys Val Arg Val Asp
100 105 110

Ala Ile Phe Lys Arg Tyr Tyr Asp Thr Gly Arg Ile Phe Ser Tyr Lys
115 120 125

Asp Thr Lys Val Asp Phe Glu Ser Tyr Ser Ala Ser Leu Ala Gly Gln
130 135 140

Glu Val Pro Ile Asn Ala Lys Glu Leu Glu Ile Leu Asp Tyr Leu Val
145 150 155 160

Lys Asn Glu Gly Arg Ala Leu Thr Arg Ser Gln Ile Ile Asp Ala Val
165 170 175

Trp Lys Ala Thr Asp Glu Val Pro Phe Asp Arg Val Ile Asp Val Tyr
180 185 190

Ile Lys Glu Leu Arg Lys Lys Leu Asp Leu Asp Cys Ile Leu Thr Val
195 200 205

Arg Asn Val Gly Tyr Lys Leu Glu Arg Lys
210 215

<210> 17

<211> 648

<212> DNA

<213> Streptococcus pneumoniae

<400> 17

atgactttat tacaattaca agatgttacc taccgttata agaatactgc tgaagcagtc 60
ctatatcaga tcaattataa ttttgaaccc ggaaaatttt acagtattat tggggagtca 120
ggagcaggaa aatccacact cttgtcccta cttgctggtc tagatagtcc ttttgaaggt 180
tctatccctt ttcaaggaga ggatattcgt aagaagggtt attcttacca tcgcac 240
catatttccc tggtcttca aaattataac ttgatagatt atcttctcc gctggaaaat 300
atccgattgg tcaacaaaaaa ggcaagcaag aatacacttc ttgagcttg tttggatgaa 360
agccagatca agcgaaatgt tctccagtt tcaggtggtc aacagcaacg tttgccatt 420
gctcgcagtt tggtctcaga agctccagtt attcttagctg atgagccaac agggaaatctg 480
gatcctaaaa ctgctggaga tattgtcgaa ctactcaa atcacttgcac gaaaacaggt 540
aaatgtgtga ttgtcgtaac tcacagtaaa gaagtggcac aagcgtcaga tattacactt 600
gaattaaagg ataagaaact gactgaaacg cgcaatacta gtaaataaa 648

<210> 18

<211> 215

<212> PRT

<213> Streptococcus pneumoniae

<400> 18

Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr
1 5 10 15

Ala Glu Ala Val Leu Tyr Gln Ile Asn Tyr Asn Phe Glu Pro Gly Lys
20 25 30

Phe Tyr Ser Ile Ile Gly Glu Ser Gly Ala Gly Lys Ser Thr Leu Leu
35 40 45

Ser Leu Leu Ala Gly Leu Asp Ser Pro Val Glu Gly Ser Ile Leu Phe

50

55

60

Gln Gly Glu Asp Ile Arg Lys Lys Gly Tyr Ser Tyr His Arg Met His
65 70 75 80

His Ile Ser Leu Val Phe Gln Asn Tyr Asn Leu Ile Asp Tyr Leu Ser
85 90 95

Pro Leu Glu Asn Ile Arg Leu Val Asn Lys Lys Ala Ser Lys Asn Thr
100 105 110

Leu Leu Glu Leu Gly Leu Asp Glu Ser Gln Ile Lys Arg Asn Val Leu
115 120 125

Gln Leu Ser Gly Gly Gln Gln Arg Val Ala Ile Ala Arg Ser Leu
130 135 140

Val Ser Glu Ala Pro Val Ile Leu Ala Asp Glu Pro Thr Gly Asn Leu
145 150 155 160

Asp Pro Lys Thr Ala Gly Asp Ile Val Glu Leu Leu Lys Ser Leu Ala
165 170 175

A
Gln Lys Thr Gly Lys Cys Val Ile Val Val Thr His Ser Lys Glu Val
180 185 190

Ala Gln Ala Ser Asp Ile Thr Leu Glu Leu Lys Asp Lys Lys Leu Thr
195 200 205

Glu Thr Arg Asn Thr Ser Lys
210 215

<210> 19
<211> 1380
<212> DNA
<213> Streptococcus pneumoniae

<400> 19
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gccaaggctt ctcaggagac cttaaaaat atcaccaata gcttctccat gcaaattcaat 180
cgtcgcgtca accaaggaac gcctcgtgg tctggaaata tcaagggtga agacatcaaa 240
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gccaagcggtt ttggaaatgg tagcttgcattt acagggtgtca atgactcctc taaaagaagac 420
aagtttgtct ctggttctta taaaacttagtc gaaggagagc acttaaccaa cgacgacaag 480
gataaaaatcc tcttgacacaa ggacttggca gccaaacacg gctggaaagt aggggacaag 540

gttaaactgg actctaatac ctacgatgca gataatgaaa aaggagccaa ggaaacagtt 600
gaagtgacaa tcaaggact ctttgatggt cataataagt cagcagtaac ctactcacaa 660
gaactttacg aaaacacagc tattacagac attcacactg ctgaaaaact ttatggatac 720
acagaagaca cagccatttta tggggacgca accttcatttgc taacagcaga caagaacttg 780
gatgatgtta tgaaagagtt gaatggcatc agtggtatca actggaagag ctacacactc 840
gtcaagagct cctctaacta cccagctttt gagcaatcta tctctggat gtacaagatg 900
gccaaacctcc tcttctgggg tagttgagc ttctcagttc tcctccttgc cctcttgctc 960
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acatcagact ttatcatcat ttttgcctt gccttggatc tagtggttct cgttatggcg 1320
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<210> 20

<211> 459

<212> PRT

<213> Streptococcus pneumoniae

<400> 20

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Ile Val Ile Phe Leu Ile Ile Leu Leu Met Ala Ser Leu Ser Leu Val
20 25 30

Gly Leu Ser Ile Lys Gly Ala Thr Ala Lys Ala Ser Gln Glu Thr Phe
35 40 45

Lys Asn Ile Thr Asn Ser Phe Ser Met Gln Ile Asn Arg Arg Val Asn
50 55 60

Gln Gly Thr Pro Arg Gly Ala Gly Asn Ile Lys Gly Glu Asp Ile Lys
65 70 75 80

Lys Ile Thr Glu Asn Lys Ala Ile Glu Ser Tyr Val Lys Arg Ile Asn
85 90 95

Ala Ile Gly Asp Leu Thr Gly Tyr Asp Leu Ile Glu Thr Pro Glu Thr
100 105 110

Lys Lys Asn Leu Thr Ala Asp Arg Ala Lys Arg Phe Gly Ser Ser Leu
115 120 125

Met Ile Thr Gly Val Asn Asp Ser Ser Lys Glu Asp Lys Phe Val Ser
130 135 140

Gly Ser Tyr Lys Leu Val Glu Gly Glu His Leu Thr Asn Asp Asp Lys
145 150 155 160

Asp Lys Ile Leu Leu His Lys Asp Leu Ala Ala Lys His Gly Trp Lys
165 170 175

Val Gly Asp Lys Val Lys Leu Asp Ser Asn Ile Tyr Asp Ala Asp Asn
180 185 190

Glu Lys Gly Ala Lys Glu Thr Val Glu Val Thr Ile Lys Gly Leu Phe
195 200 205

Asp Gly His Asn Lys Ser Ala Val Thr Tyr Ser Gln Glu Leu Tyr Glu
210 215 220

Asn Thr Ala Ile Thr Asp Ile His Thr Ala Ala Lys Leu Tyr Gly Tyr
225 230 235 240

Thr Glu Asp Thr Ala Ile Tyr Gly Asp Ala Thr Phe Phe Val Thr Ala
245 250 255

Asp Lys Asn Leu Asp Asp Val Met Lys Glu Leu Asn Gly Ile Ser Gly
260 265 270

Ile Asn Trp Lys Ser Tyr Thr Leu Val Lys Ser Ser Ser Asn Tyr Pro
275 280 285

Ala Leu Glu Gln Ser Ile Ser Gly Met Tyr Lys Met Ala Asn Leu Leu
290 295 300

Phe Trp Gly Ser Leu Ser Phe Ser Val Leu Leu Leu Ala Leu Leu Leu
305 310 315 320

Ser Leu Trp Ile Asn Ala Arg Arg Lys Glu Val Gly Ile Leu Leu Ser
325 330 335

Ile Gly Leu Lys Gln Ala Ser Ile Leu Gly Gln Phe Ile Thr Glu Ser
340 345 350

Ile Leu Ile Ala Ile Pro Ala Leu Val Ser Ala Tyr Phe Leu Ala Asn
355 360 365

Tyr Thr Ala Arg Ala Ile Gly Asn Thr Val Leu Ala Asn Val Thr Ser
370 375 380

Gly Val Ala Lys Gln Ala Ser Lys Ala Ala Gln Ala Ser Asn Leu Gly
385 390 395 400

Gly Gly Ala Glu Val Asp Gly Phe Ser Lys Thr Leu Ser Ser Leu Asp
 405. 410 415

Val Leu Val Val Leu Val Met Ala Leu Ala Ser Ser Asn Leu Leu Arg
435 440 445

Lys Gln Pro Lys Glu Leu Leu Leu Asp Gly Glu
450 455

<210> 21
<211> 1278
<212> DNA
<213> *Streptococcus pneumoniae*

<400> 21
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tccaacaaaa cagtagaaaag caatctttat aaatcactca atacatctt ttcttattaag 180
aagatagaga atggtcagac attcaagttg tcagacccatg catctgtaaag caagattaag 240
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gtgactggcg agcagagcgt ggagcgtgat gatttacccat ctgcagacaa taacttggtt 360
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ctaaaagaag ggcgacaccc tcaaaaaggg gattccaaga aaatccttac ccacgaagaa 480
ttggctaaga agaacggctt ttgcgttcat gacaagattg gcttggatgc ttggctagtct 540
aatctggaa aaggacaaac agtagagttt gagattatcg gcatctttc ttggaaaaaaa 600
caagagaaat tcacaggctt gtcttctgac ttcaatggaa atcaagtctt tacagactat 660
gaaagttagcc aaaccctttt gggcaatagt gaagctcaag tcagtgcagc acgcttctat 720
gtagaaaaat ctaaggaaat ggacggactc atgaaggcagg tagaaaaactt ggccttggaa 780
aatcaaggct accaagtcga aaaggaaaac aaggctttt aacaaatcaa agactcagtt 840
gcaactttcc aaaccttcct gaccatcttc ctatggaa tggtgatagc aggagctgga 900
gccttaattc tggtttgtc tctctgggt agagaacggg tctatgaagt ggggattttt 960
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agttgcttat ctgttagccct ttgtttccta ttcttattta gaaaatcacc gaaagaattt 1260
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<210> 22
<211> 425
<212> PRT
<213> *Streptococcus pneumoniae*

<400> 22

Met Asn Pro Ile Gln Arg Ser Trp Ala Tyr Val Ser Arg Lys Arg Leu
1 5 10 15

Arg Ser Phe Ile Leu Phe Leu Ile Leu Leu Val Leu Leu Ala Gly Ile
20 25 30

Ser Ala Cys Leu Thr Leu Met Lys Ser Asn Lys Thr Val Glu Ser Asn
35 40 45

Leu Tyr Lys Ser Leu Asn Thr Ser Phe Ser Ile Lys Lys Ile Glu Asn
50 55 60

Gly Gln Thr Phe Lys Leu Ser Asp Leu Ala Ser Val Ser Lys Ile Lys
65 70 75 80

Gly Leu Glu Asn Val Ser Pro Glu Leu Glu Thr Val Ala Lys Leu Lys
85 90 95

Asp Lys Glu Ala Val Thr Gly Glu Gln Ser Val Glu Arg Asp Asp Leu
100 105 110

Ser Ala Ala Asp Asn Asn Leu Val Ser Leu Thr Ala Leu Glu Asp Ser
115 120 125

Ser Lys Asp Val Thr Phe Thr Ser Ser Ala Phe Asn Leu Lys Glu Gly
130 135 140

Arg His Leu Gln Lys Gly Asp Ser Lys Lys Ile Leu Ile His Glu Glu
145 150 155 160

Leu Ala Lys Lys Asn Gly Leu Ser Leu His Asp Lys Ile Gly Leu Asp
165 170 175

Ala Gly Gln Ser Glu Ser Gly Lys Gly Gln Thr Val Glu Phe Glu Ile
180 185 190

Ile Gly Ile Phe Ser Gly Lys Gln Glu Lys Phe Thr Gly Leu Ser
195 200 205

Ser Asp Phe Ser Glu Asn Gln Val Phe Thr Asp Tyr Glu Ser Ser Gln
210 215 220

Thr Leu Leu Gly Asn Ser Glu Ala Gln Val Ser Ala Ala Arg Phe Tyr
225 230 235 240

Val Glu Asn Pro Lys Glu Met Asp Gly Leu Met Lys Gln Val Glu Asn
245 250 255

Leu Ala Leu Glu Asn Gln Gly Tyr Gln Val Glu Lys Glu Asn Lys Ala
260 265 270

Phe Glu Gln Ile Lys Asp Ser Val Ala Thr Phe Gln Thr Phe Leu Thr
275 280 285

Ile Phe Leu Tyr Gly Met Leu Ile Ala Gly Ala Gly Ala Leu Ile Leu
290 295 300

Val Leu Ser Leu Trp Leu Arg Glu Arg Val Tyr Glu Val Gly Ile Leu
305 310 315 320

Leu Ala Leu Gly Lys Gly Lys Ser Ser Ile Phe Leu Gln Phe Cys Leu
325 330 335

Glu Val Val Leu Val Ser Leu Gly Ala Leu Leu Pro Ala Phe Val Ala
340 345 350

Gly Asn Ala Ile Thr Thr Tyr Leu Leu Gln Thr Leu Leu Ala Ser Gly
355 360 365

Asp Gln Ala Ser Leu Gln Asp Thr Leu Ala Lys Ala Ser Ser Leu Ser
370 375 380

Thr Ser Ile Leu Ser Phe Ala Glu Ser Tyr Val Phe Leu Val Leu Leu
385 390 395 400

Ser Cys Leu Ser Val Ala Leu Cys Phe Leu Phe Leu Phe Arg Lys Ser
405 410 415

Pro Lys Glu Ile Leu Ser Ser Ile Ser
420 425

<210> 23
<211> 1407
<212> DNA
<213> Streptococcus pneumoniae

<400> 23
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aggtagacaaa tgaatccaat ccaaagatct tgggctttag tcagcagaaaa gcgactgaga 180
agttttatTT tatttctgat tttattggc ttattggccg gaatttcagc ctgttgact 240
ctgatgaagt ccaacaaaac agtagaaagc aatctttata aatcactcaa tacatcttt 300
tctattaaga agatagagaa tggtcagaca ttcaagttgt cagaccttagc atctgtaagc 360
aagattaagg ggctggaaaaa tgtctctcct gaacctgaga cggtegc当地 actaaaagac 420
aaggaagcag tgactggcga gcagagcgtg gagcgtgatg atttatcagc tgcagacaat 480

aacttggtta gcttaacggc tcttgaggat tcataccaagg atgtaacctt taccagttcg 540
gcttcataatc taaaagaagg gcgcacacccaa caaaaagggg attccaagaa aatccttatac 600
cacgaagaat tggctaagaa gaacggctt tcgcttcatg acaagattgg cttggatgct 660
ggtcagtctg aatctggaaa aggacaaaca gtagagttt agattatcgg catctttct 720
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Asp Lys Glu Ala Val Thr Gly Glu Gln Ser Val Glu Arg Asp Asp Leu
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Met Xaa Xaa Xaa Xaa Xaa Asn Val Leu Ser Xaa Gly Xaa Xaa Xaa Ala
1 5 10 15

Xaa Xaa Xaa Xaa Ala Xaa Xaa Xaa Asn
20 25

<210> 44

<211> 27

<212> PRT

<213> Streptococcus pneumoniae

<400> 44

Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25

C1
<210> 45

<211> 312

<212> DNA

<213> Streptococcus pneumoniae

<400> 45

aatttgaaaa aatgagtcta gaataaagat tgcatcttgt gtttctattc aagaatagt 60
gataggaatg gctatttaac aattcaaaat aaatccgaaa gcagtggta aaatcattgc 120
tttcagttgc tttcttgta cttagtgct taaatataat atactaaagt tatggaattt 180
atgagaaaagg aatttcacaa cgtttatct agtggcagt tgcttcaga caaaaggcca 240
gcaagagact ataataaaaa atagggtagg tatttattct aagaaaaata aaaaatagag 300
agcagttaaa gt 312

<210> 46

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 46

aatgagtcta gaataaagat tgc

23

<210> 47

<211> 27

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Modified
Streptococcus Pneumonia peptide

<400> 47

Met Arg Lys Glu Phe His Asn Val Leu Ser Ala Gly Gln Leu Leu Ala
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25

<210> 48

<211> 30

<212> PRT

<213> Streptococcus pneumoniae

<400> 48

Met Glu Phe Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Gly Gln
1 5 10 15

Leu Leu Ala Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25 30

<210> 49

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 49

acgaagaatt cgctaagaag aacggt

26

<210> 50

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 50

attaaggatc cagctatcaa

20

<210> 51
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 51
atcaaggat ccactgccaa ggc 23

<210> 52
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

01
<400> 52
agaggagaat tcccacttcc ttgcg 25

<210> 53
<211> 81
<212> DNA
<213> Streptococcus pneumoniae

<400> 53
atgagaaaagg aatttcacaa cgtttatct agtggtcagt tgcttcaga caaaaggcca 60
gcaagagact ataataaaaa a 81

<210> 54
<211> 90
<212> DNA
<213> Streptococcus pneumoniae

<400> 54
atgaaattta tgagaaaagga atttcacaaac gtttatcta gtggtcagtt gcttcagac 60
aaaaggccag caagagacta taataaaaa 90

<210> 55
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Consensus

<220>
<221> PEPTIDE
<222> (1)
<223> Xaa can be Leu or Tyr

<220>
<221> PEPTIDE
<222> (5)
<223> Xaa can be Gln or Met

<400> 55
Xaa Ser Gly Gly Xaa
1 5

<210> 56
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 56
acgaagaatt cgctaagaag aacggt

26

<210> 57
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 57
attaaggatc cagctatcaa

20

<210> 58
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 58
atcaaggat ccactgccaa ggc

23

<210> 59
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 59
agaggagaat tcccaacttcc ttgcg

25

<210> 60
<211> 27
<212> PRT
<213> Streptococcus Pneumoniae

<220>
<223> Description of Artificial Sequence: Synthetic
amino acids

<400> 60
Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Asp Gln Leu Leu Thr
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn Arg Lys
20 25

<210> 61
<211> 25
<212> PRT
<213> Streptococcus Pneumoniae

<220>
<223> Description of Artificial Sequence: Synthetic
amino acids

<400> 61
Met Arg Lys Glu Phe His Asn Val Leu Ser Ser Asp Gln Leu Leu Thr
1 5 10 15

Asp Lys Arg Pro Ala Arg Asp Tyr Asn
20 25

<210> 62
<211> 33

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
amino acids

<400> 62

Gln Asn Tyr Asn Leu Ile Asp Tyr Leu Ser Pro Leu Glu Asn Ile Arg
1 5 10 15

Leu Val Asn Lys Lys Ala Ser Lys Asn Thr Leu Leu Glu Leu Gly Leu
20 25 30

Asp

A | <210> 63

<211> 33

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
amino acids

<400> 63

Gln Asn Tyr Asn Leu Ile Asp Tyr Leu Ser Pro Leu Glu Asn Ile Gln
1 5 10 15

Leu Val Asn Lys Lys Ala Ser Lys Asp Thr Leu Leu Glu Leu Gly Leu
20 25 30

Asp

A | <210> 64

<211> 215

<212> PRT

<213> Streptococcus Pneumoniae

<400> 64

Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr
1 5 10 15

Ala Glu Ala Val Leu Tyr Gln Ile Asn Tyr Asn Phe Glu Pro Gly Lys

20

25

30

Phe Tyr Ser Ile Ile Gly Glu Ser Gly Ala Gly Lys Ser Thr Leu Leu
35 40 45

Ser Leu Leu Ala Gly Leu Asp Ser Pro Val Glu Gly Ser Ile Leu Phe
50 55 60

Gln Gly Glu Asp Ile Arg Lys Lys Gly Tyr Ser Tyr His Arg Met His
65 70 75 80

His Ile Ser Leu Val Phe Gln Asn Tyr Asn Leu Ile Asp Tyr Leu Ser
85 90 95

Pro Leu Glu Asn Ile Gln Leu Val Asn Lys Lys Ala Ser Lys Asp Thr
100 105 110

Leu Leu Glu Leu Gly Leu Asp Glu Ser Gln Ile Lys Arg Asn Val Leu
115 120 125

Gln Leu Ser Gly Gly Gln Gln Arg Val Ala Ile Ala Arg Ser Leu
130 135 140

Val Ser Glu Ala Pro Val Ile Leu Ala Asp Glu Pro Thr Gly Asn Leu
145 150 155 160

Asp Pro Lys Thr Ala Gly Asp Ile Val Glu Leu Leu Lys Ser Leu Ala
165 170 175

Gln Lys Thr Gly Lys Cys Val Ile Val Val Thr His Ser Lys Glu Val
180 185 190

Ala Gln Ala Ser Asp Ile Thr Leu Glu Leu Lys Asp Lys Lys Leu Thr
195 200 205

Glu Thr Arg Asn Thr Ser Lys
210 215

<210> 65

<211> 84

<212> DNA

<213> Streptococcus Pneumoniae

<400> 65

atgagaaaagg aatttcacaa cgtttatct agtggtcagt tgcttgcaga caaaaggcca 60
gcaagagact ataatagaaa atag 84

<210> 66
<211> 84
<212> DNA
<213> Streptococcus pneumoniae

<400> 66
atgagaaaagg aatttcacaa cgtttatct agtgatcagt tgcttacaga caaaaggcca 60
gcaagagact ataataaaaa atag 84

<210> 67
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 67
ctgctgaagc agtcctatat 20

<210> 68
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 68
ttcgacaata tctccagcag 20

<210> 69
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 69
gagctcttgc tggatggta 20

<210> 70
<211> 20
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 70

cctcacggat catctttca

20

<210> 71

<211> 675

<212> DNA

<213> Streptococcus pneumoniae

<400> 71

atgactttat tacaattaca agatgttacc taccgttata agaataactgc tgaagcagtc 60
ccatataaga atactgctga agcagtccta tatcagatca attataattt tgaacccgga 120
aaatttaca gtattattgg ggagtcagga gcaggaaaaat ccacactctt gtcctactt 180
gctggtagt atagtcctgt tgaaggttct atcccttttc aaggagagga tattcgtaag 240
aagggctatt cttaccatcg catgcaccat atttccctgg tctttcaaaa ttataacttg 300
atagattatc tttctccgct ggaaaatatc cgatggtca acaaaaaggc aagcaaggat 360
acacttcttg agcttggttt ggatgaaagt cagatcaagc ggaatgttct ccagttatca 420
ggtgtcaac agcaacgtgt tgccattgct cgccagttgg tctcagaagc tccagttatt 480
ctagctgatg agccaacagg aaatctggat cctaaaactg ctggagatata tgcgaacta 540
ctcaaatac ac ttgcccagaa aacaggtaaa tgttgattt tcgttaactca cagtaaagaa 600
gtggcacaag cgtcagatata tacacttgaa ttaaaggata agaaaactgac tgaaaacgcgc 660
aatactagta aataa 675

<210> 72

<211> 224

<212> PRT

<213> Streptococcus pneumoniae

<400> 72

Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr

1

5

10

15

Ala Glu Ala Val Pro Tyr Lys Asn Thr Ala Glu Ala Val Leu Tyr Gln

20

25

30

Ile Asn Tyr Asn Phe Glu Pro Gly Lys Phe Tyr Ser Ile Ile Gly Glu

35

40

45

Ser Gly Ala Gly Lys Ser Thr Leu Leu Ser Leu Leu Ala Gly Leu Asp

50

55

60

Ser Pro Val Glu Gly Ser Ile Leu Phe Gln Gly Glu Asp Ile Arg Lys

65

70

75

80

Lys Gly Tyr Ser Tyr His Arg Met His His Ile Ser Leu Val Phe Gln

85

90

95

Asn Tyr Asn Leu Ile Asp Tyr Leu Ser Pro Leu Glu Asn Ile Arg Leu
100 105 110

Val Asn Lys Lys Ala Ser Lys Asp Thr Leu Leu Glu Leu Gly Leu Asp
115 120 125

Glu Ser Gln Ile Lys Arg Asn Val Leu Gln Leu Ser Gly Gly Gln Gln
130 135 140

Gln Arg Val Ala Ile Ala Arg Ser Leu Val Ser Glu Ala Pro Val Ile
145 150 155 160

Leu Ala Asp Glu Pro Thr Gly Asn Leu Asp Pro Lys Thr Ala Gly Asp
165 170 175

Ile Val Glu Leu Leu Lys Ser Leu Ala Gln Lys Thr Gly Lys Cys Val
180 185 190

Ile Val Val Thr His Ser Lys Glu Val Ala Gln Ala Ser Asp Ile Thr
195 200 205

Leu Glu Leu Lys Asp Lys Lys Leu Thr Glu Thr Arg Asn Thr Ser Lys
210 215 220

A
<210> 73
<211> 675
<212> DNA
<213> Streptococcus pneumoniae

<400> 73
atgactttat tacaattaca agatgttacc taccgttata agaatactgc tgaagcagtc 60
ccatataaga atactgctga agcagtccta tatcagatca attataattt tgaacccgga 120
aaattttaca gtattattgg ggagtcagga gcaggaaaaat ccacactctt gtccctactt 180
gctggtctag atagtccctgt tgaaggttct atcccttttc aaggagagga tattcgtaag 240
aagggctatt cttaccatcg catgcaccat attccctgg tctttcaaaa ttataacttg 300
atagattatc tttctccgct gaaaaatatc cgattggtca acaaaaaggc aagcaaggat 360
acacttcttgc agcttggttt ggatgaaagt cagatcaagc ggaatgttct ccagttatca 420
ggtgtcaac agcaacgtgt tgccattgtc cgcaattttgg tctcagaagc tccagttatt 480
ctagctgatg agccaacagg aaatctggat cctaaaactg ctggagatat tgtcgaacta 540
ctcaaatcac ttgcccgaaa aacaggtaaa tgttgattt tcgtaactca cagtaaagaa 600
gtggcacaag cgtcagatat tacacttggaa ttaaaggata agaaaactgac tggaaacgcgc 660
aatactagta aataa 675

<210> 74

<211> 224

<212> PRT

<213> Streptococcus pneumoniae

<400> 74

Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr
1 5 10 15

Ala Glu Ala Val Pro Tyr Lys Asn Thr Ala Glu Ala Val Leu Tyr Gln
20 25 30

Ile Asn Tyr Asn Phe Glu Pro Gly Lys Phe Tyr Ser Ile Ile Gly Glu
35 40 45

Ser Gly Ala Gly Lys Ser Thr Leu Leu Ser Leu Leu Ala Gly Leu Asp
50 55 60

Ser Pro Val Glu Gly Ser Ile Leu Phe Gln Gly Glu Asp Ile Arg Lys
65 70 75 80

Lys Gly Tyr Ser Tyr His Arg Met His His Ile Ser Leu Val Phe Gln
85 90 95

Asn Tyr Asn Leu Ile Asp Tyr Leu Ser Pro Leu Glu Asn Ile Arg Leu
100 105 110

Val Asn Lys Lys Ala Ser Lys Asp Thr Leu Leu Glu Leu Gly Leu Asp
115 120 125

Glu Ser Gln Ile Lys Arg Asn Val Leu Gln Leu Ser Gly Gly Gln Gln
130 135 140

Gln Arg Val Ala Ile Ala Arg Ser Leu Val Ser Glu Ala Pro Val Ile
145 150 155 160

Leu Ala Asp Glu Pro Thr Gly Asn Leu Asp Pro Lys Thr Ala Gly Asp
165 170 175

Ile Val Glu Leu Leu Lys Ser Leu Ala Gln Lys Thr Gly Lys Cys Val
180 185 190

Ile Val Val Thr His Ser Lys Glu Val Ala Gln Ala Ser Asp Ile Thr
195 200 205

Leu Glu Leu Lys Asp Lys Lys Leu Thr Glu Thr Arg Asn Thr Ser Lys
210 215 220

<210> 75
<211> 1281
<212> DNA
<213> Streptococcus pneumoniae

<400> 75
atgaatccaa tccaaagatc ttgggcttat gtcagcagaa agcgactgag aagttttatt 60
ttatttctga ttttatttgggt cttattggcc ggaatttcag cctgtttgac tctgatgaag 120
tccaaacaaaa cagtagaaaag caatctttat aaatcactca atacatctt ttctattaag 180
aagatagaga atggtcagac attcaagttg tcagacctag catctgttaag caagattaag 240
gggctggaaa atgtctctcc tgaacttgag acggtcgcaa aactaaaaga caaggaagca 300
gtgactggcg agcagagcgt ggagcgtat gatttatcag ctgcagacaa taacttggtt 360
agcttaacgg ctcttgagga ttcatccaag gatgtaacct ttaccagttc ggcttcaat 420
ctaaaagaag ggcgacacact tcaaaaaggg gattccaaga aaatccttat ccacgaagaa 480
gaattggcta agaagaacgg tcttcgctt catgacaaga ttggcttggta tgctggcag 540
tctgaatctg gaaaaggaca aacagttagag tttgagatta ttggcatttt ttctggtaaa 600
aaacaagaga aattcacagg cttgtcttct gacttcagtg aaaaatcaagt ctttacagac 660
tatgaaagta gccaaaccct tttggcaat agtgaagctc aagtcaagtgc agcacgcttc 720
tatgttagaaa atcctaagga aatggacgga ctcataaagc aggttagaaaa cttggcctt 780
gaaaatcaag gctaccaagt cgaaaaggaa aacaaggctt ttgaacaaat caaagactca 840
gttgcaactt tccaaacacctt cctgaccatc ttccctttagt ggatgtttagt agcaggagct 900
ggagccttaa ttctggtttt gtctctctgg ttgagagaac gggctatga agtggggatt 960
ttacttgac ttggaaaagg caagagctcg atcttcctac aattctgttt agaggttagtt 1020
ttggtatctc ttggagcttt gcttccagca tttgttgcag gaaacgcaat cacaacttac 1080
ctactccaaa ctctactagc aagtggagat caggaagct tacaagatac actagccaaa 1140
gcaaggcagtt tatcaactag catcttatct tttgcagaat cctatgttt tctagttctg 1200
cttagttgct tatctgttagc ctttggtttc ctattcttat ttagaaaatc accgaaagaa 1260
attttatcat ctatttagtta a 1281

<210> 76
<211> 224
<212> PRT
<213> Streptococcus pneumoniae

<400> 76
Met Thr Leu Leu Gln Leu Gln Asp Val Thr Tyr Arg Tyr Lys Asn Thr
1 5 10 15

Ala Glu Ala Val Pro Tyr Lys Asn Thr Ala Glu Ala Val Leu Tyr Gln
20 25 30

Ile Asn Tyr Asn Phe Glu Pro Gly Lys Phe Tyr Ser Ile Ile Gly Glu
35 40 45

Ser Gly Ala Gly Lys Ser Thr Leu Leu Ser Leu Leu Ala Gly Leu Asp

50

55

60

Ser Pro Val Glu Gly Ser Ile Leu Phe Gln Gly Glu Asp Ile Arg Lys
65 70 75 80

Lys Gly Tyr Ser Tyr His Arg Met His His Ile Ser Leu Val Phe Gln
85 90 95

Asn Tyr Asn Leu Ile Asp Tyr Leu Ser Pro Leu Glu Asn Ile Arg Leu
100 105 110

Val Asn Lys Lys Ala Ser Lys Asp Thr Leu Leu Glu Leu Gly Leu Asp
115 120 125

Glu Ser Gln Ile Lys Arg Asn Val Leu Gln Leu Ser Gly Gly Gln Gln
130 135 140

Gln Arg Val Ala Ile Ala Arg Ser Leu Val Ser Glu Ala Pro Val Ile
145 150 155 160

Leu Ala Asp Glu Pro Thr Gly Asn Leu Asp Pro Lys Thr Ala Gly Asp
165 170 175

Ile Val Glu Leu Leu Lys Ser Leu Ala Gln Lys Thr Gly Lys Cys Val
180 185 190

Ile Val Val Thr His Ser Lys Glu Val Ala Gln Ala Ser Asp Ile Thr
195 200 205

Leu Glu Leu Lys Asp Lys Lys Leu Thr Glu Thr Arg Asn Thr Ser Lys
210 215 220